### 6.2.4 Study on the Effect of the Vehicle Weight on Noise level

Increasing test vehicle weight may cause more noise. However, the relationships between the weight of vehicle and pavement noise level OBSI are not reported by other researchers. This study will be highly beneficial for the NCDOT to: (i) obtain pavement acoustical data due to heavy vehicles; (ii) to compare the data with the light passenger car data. This research will provide useful information for future development of noise-compatible pavement types for use in urban areas and high volume roads.

### 6.2.5 Tire-Pavements Deterioration Rate for Different Types of Pavements

It will be beneficial to conduct a deterioration rate study for certain pavements - a proposed team can collect tire-pavement noise data from pavements with a service life of 1 to 20 years for asphalt pavement and 1 to 30 years for concrete pavements. The relationships will be established and the deterioration rates will be given for the selected pavements. The results will be fundamental and important in the future to accurately define a 'quiet pavement'.

In this project, pavements selected for OBSI data are generally one to three years old. It is known that the noise level will increase along with the increase of pavement life; however the rate of noise increase is varied. Some pavements may have zero loss within 3 years in terms of sound intensity, some pavements may have 2 to 3 dBA loss within the same time. The deterioration rate is not clear for long term period. When selecting or defining a 'quieter pavement', deterioration rate' or 'reduction rate' (the sound intensity change trend) is another factor to be considered, along with the OBSI data obtained when the pavement is newly paved. In this study, tire-pavement noise data will be collected from pavements with service life of 1 to 20 years for asphalt pavement and 1 to 30 years for concrete pavements. The results will be fundamental and important for future accurately defining a 'quiet pavement'. The changes of sound intensity of a particular pavement reflect the tire-pavement noise 'deterioration rate'. This 'deterioration rate' can be different from one pavement to another. 'Deterioration rate' can be used as an evaluation parameter along with the OBSI data collected when the pavement is new. The two parameters should be used to comprehensively evaluate and define 'quieter pavement'.

### 6.2.6 Comparison Study of Sound Intensity Pavement Noise Level

It is necessary to investigate the effect of construction related factors on tire-pavement noise. This study will focus on several parameters which may affect pavement noise from construction. The parameters include the pavement smoothness (IRI) at each stage and micro texture, material/surface segregation. It also compares the deterioration rate of IRI and OBSI. The NCDOT's various units can use the results in project specifications as quieter pavement considerations. It will be highly beneficial for the NCDOT to obtain pavement acoustical data with different surface characteristics parameters. The research will provide useful information to further improve construction and development of noise-compatible pavement types.